

What is claimed is:

1.A fuel cell system comprising:

5 a fuel tank storing a fuel comprising an ether, water,
and an alcohol;

a vaporizer vaporizing the fuel;

a reformer reforming the vaporized fuel into a hydrogen
rich gas;

10 a CO gas removal apparatus configured to remove CO gas
in the hydrogen rich gas; and

a fuel cell unit configured to generate electricity by
electrochemical reaction of the hydrogen rich gas and
oxygen.

15 2. The fuel cell system of claim 1, wherein the fuel includes
a dimethyl ether.

3. The fuel cell system of claim 1, wherein the fuel includes
a methanol.

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4. The fuel cell system of claim 1, wherein the fuel includes
an ethanol.

5. The fuel cell system of claim 1, wherein the fuel includes
25 less than 10wt% of methanol.

6. The fuel cell system of claim 1, wherein the fuel includes:

dimethyl ether;

water; and

5-10wt% of methanol,

5 wherein the mixing ratio of dimethyl ether and water is
in a range of 1:3 to 1:4.

7. The fuel cell system of claim 1, wherein the fuel tank
comprises:

10 a cartridge unit configured to store a fuel;
a valve unit configured to close an opening of the
cartridge unit;
a holding unit facing to the opening and configured to
hold the cartridge unit; and
15 a supplying unit connected to the holding unit and
configured to supply the fuel.

8. The fuel cell system of claim 7, wherein the cartridge unit
stores a dimethyl ether.

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9. The fuel cell system of claim 1, further comprising:

a combustor combusting a gas supplied from the fuel cell
unit; and

a vacuum heat insulation container containing the
25 combustor, containing the vaporizer, the reformer, and the
CO gas removal apparatus disposed adjacent to the combustor.

10. The fuel cell system of claim 1, wherein the reformer contains a reforming catalyst of an alumina and at least one material selected from the group consisting of Rh, Pd, Pt, and Cu.

11. The fuel cell system of claim 1, wherein the reformer contains a reforming catalyst to prompt a reforming reaction of the fuel and a shift catalyst to react carbon monoxide generated by the reforming reaction with water.

12. A fuel cell system comprising:
a first fuel tank storing a first fuel including ether;
a second fuel tank storing a second fuel including a methanol and water;
a vaporizer vaporizing the second fuel;
a reformer reforming the first and second fuel into a hydrogen rich gas;
a CO gas removal apparatus configured to remove CO gas from the hydrogen rich gas; and
a fuel cell unit configured to generate electricity by electrochemical reaction of the hydrogen rich gas and oxygen.

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13. The fuel cell system of claim 12; wherein the first fuel

includes a dimethyl ether.

14. The fuel cell system of claim 12, wherein the first fuel includes dimethyl ether and the second fuel includes 5-10wt% of methanol, and the mixing ratio of dimethyl ether and water is in a range of 1:3 to 1:4.

15. The fuel cell system of claim 12, wherein the first fuel tank comprises:

10 a cartridge unit configured to store a fuel;
a valve unit configured to close an opening of the cartridge unit;
a holding unit facing to the opening and configured to hold the cartridge unit; and
15 a supplying unit connected to the holding unit and configured to supply the fuel.

16. The fuel cell system of claim 12, wherein the reformer contains a reforming catalyst of alumina and at least one material selected from the group consisting of Rh, Pd, Pt, and Cu.

17. The fuel cell system of claim 12, wherein the reformer contains a reforming catalyst to prompt a reforming reaction of the fuel and a shift catalyst to react carbon monoxide generated by the reforming reaction with water.

18. A fuel cell system comprising:
- a first tank storing a fuel including ether;
 - a second tank storing water;
 - 5 a third tank storing a hydrogen;
 - a vaporizer vaporizing the water;
 - a reformer reforming the fuel, water, and hydrogen into
 - a hydrogen rich gas;
 - a CO gas removal apparatus configured to remove CO gas
 - 10 from the hydrogen rich gas; and
 - a fuel cell unit configured to generate electricity by
 - electrochemical reaction of the hydrogen rich gas and
 - oxygen.
- 15 19. The fuel cell system of claim 18, wherein the first tank comprises:
- a cartridge unit configured to store the fuel;
 - a valve unit configured to close an opening of the
 - cartridge unit;
 - 20 a holding unit facing to the opening and configured to
 - hold the cartridge unit; and
 - a supplying unit connected to the holding unit and
 - configured to supply the fuel.
- 25 20. The fuel cell system of claim 18, wherein the reformer contains a reforming catalyst of alumina and at least one

material selected from the group consisting of Rh, Pd, Pt,
and Cu.

21. The fuel cell system of claim 18, wherein the reformer
5 contains a reforming catalyst to prompt a reforming
reaction of the fuel and a shift catalyst to react carbon
monoxide generated by the reforming reaction with water.

22. A fuel for a fuel cell system comprising:
10 dimethyl ether;
water; and
5-10wt% of methanol,
wherein the mixing ratio of dimethyl ether and water
is in a range of 1:3 to 1:4.

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23. A fuel tank for a fuel cell system comprising:
dimethyl ether;
water; and
methanol.

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